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(54) Reproduction apparatus total customer support network

(57) A telecommunications network interconnects reproduction apparatus (copiers or printers) 12A to 12W, telephones located in close proximity to each apparatus 12, local means 20 for collecting data from an apparatus 12, a manned customer assistance center 30, a diagnostic and administrative device 40 for collecting and analyzing data from the apparatus 12, remote means 50 for collecting apparatus usage data, and remote means 60 responsive to a signal from an apparatus 12 for collecting data therefrom. An artificial intelligence unit 70 may supplement or replace the device 40. Device 40, remote means 60 and unit 70 are each operable to provide signals sent back to a particular reproduction apparatus 12 designating alterations necessary for efficient operation of that apparatus. If it is determined that the alterations necessary for efficient operation of a particular apparatus cannot be remotely effected, any of the systems 40, 60 and 70 is capable of contacting a field administrative system 80 which can dispatch a field engineer to perform service on that apparatus. If necessary, a customer at the site of an apparatus 12 may use the telephone thereat for direct voice contact with the customer assistance center 30 or with service personnel.

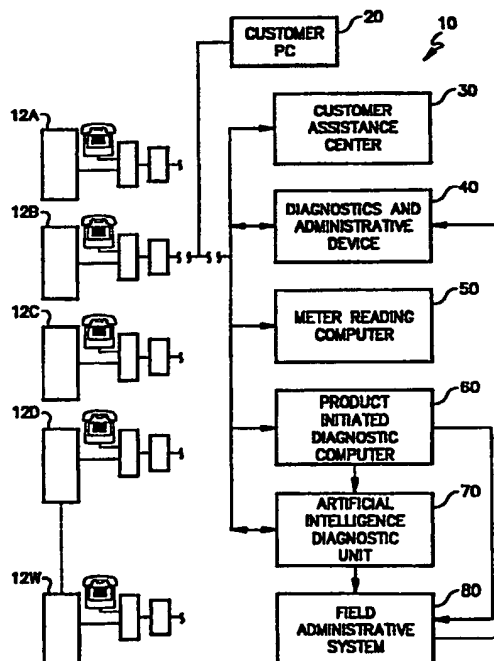


FIG. 1

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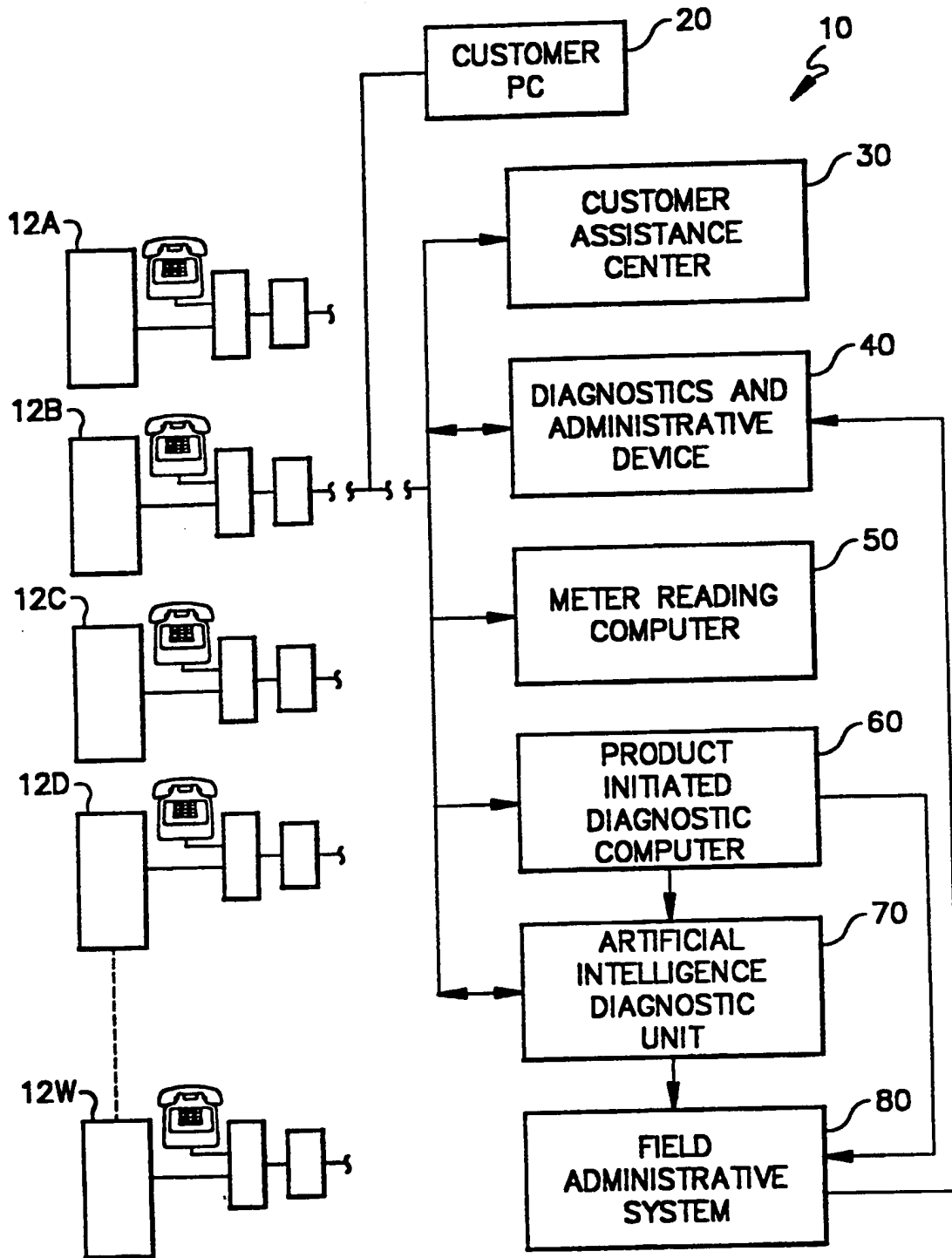


FIG. 1

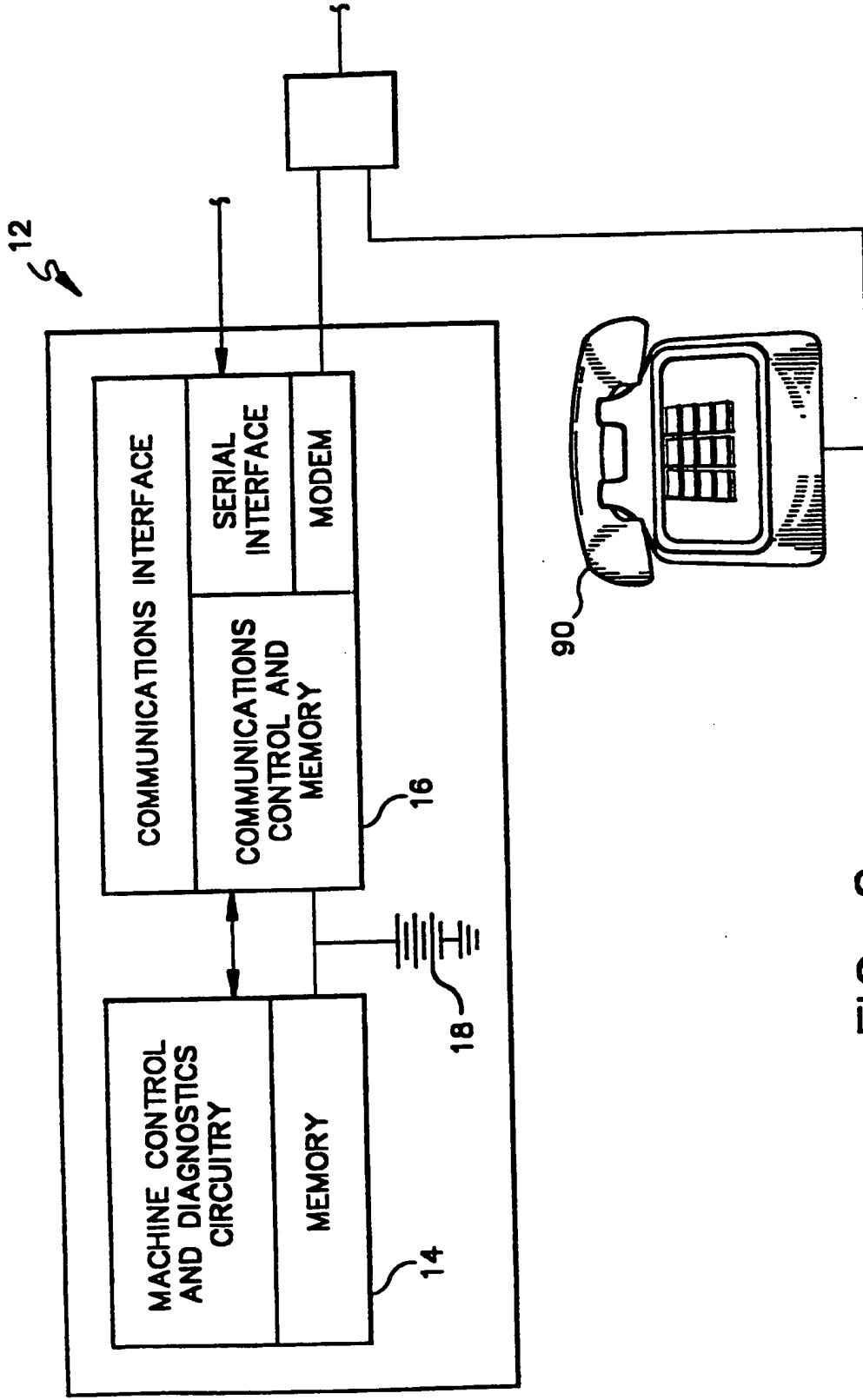


FIG. 2

REPRODUCTION APPARATUS TOTAL CUSTOMER SUPPORT NETWORKBACKGROUND OF THE INVENTIONTechnical Field

5 The present invention relates in general to a customer support network for reproduction apparatus, and more particularly to a total customer support network wherein there is selective interactive communication between the reproduction apparatus
10 customer, the reproduction apparatus per se, and a comprehensive service center.

Background Art

Reproduction apparatus, such as copiers or printers for example, have generally been provided as
15 stand-alone devices. Usage related functions, such as accounting and diagnostics, are typically accomplished through the use of computer controlled copy counters, jam detectors, indicators, and the like located within the reproduction apparatus. Recent advances in the
20 fields of computer and telecommunication technologies have enabled the self-monitoring capabilities of reproduction apparatus, made possible by the use of microprocessor controllers and internal memories provided within the reproduction apparatus, to be
25 utilized on a telecommunication network to remotely interface with such reproduction apparatus (see copending, commonly assigned US Pat. App. Ser. No. 643,592, filed January 18, 1991, in the name of Allen et al).

30 US Pat. App. Ser. No. 643,592, describes a system for remote monitoring of reproduction apparatus, where the reproduction apparatus includes a standard communication interface by which billing and diagnostic data may be transferred to a diagnostic and
35 administrative device without the need for dedicated communication lines or data transfer equipment. As such, the system provides for remote monitoring of a

plurality of reproduction apparatus which enables both on-site data collection using a conventional portable or laptop computer, and remote data collection via standard dedicated or non-dedicated phone lines. Each reproduction apparatus to be monitored is provided with a communication interface including a telecommunication modem for the purpose of transferring diagnostic and accounting information to a remote diagnostic and administrative device. The communication interface includes a standard serial interface (such as RS-232) and a standard telephone modem.

Accordingly, for cost allocation purposes within an organization, a central record of the total number of copies produced by any or all of the reproduction apparatus of that organization may be accumulated; also of the number of copies produced by each section or division of the organization, some of which may have access to two or more reproduction apparatus may be recorded. In addition to yielding information necessary for billing purposes, this accounting information helps in supply planning so that any particular reproduction apparatus will not run out of supplies (such as copy sheets, toner, and the like) during use, without requiring frequent inspection of each reproduction apparatus on an individual basis.

Moreover, this system serves diagnostic purposes in that it substantially eliminates the necessity for an on-site operator, generally untrained in service procedures, to diagnose a problem of a reproduction apparatus by referring to service manuals. That is, the information transmitted to the diagnostic and administration device enables the device to determine the problem and designate an appropriate correction procedure. However, in certain instances, the problem or malfunction may not be

diagnostic and administration device, or the operator may decide that it is necessary to call authorized maintenance personnel to repair or resupply the reproduction apparatus. This requires locating a
5 phone which is usually remote relative to the particular reproduction apparatus in need of service. In addition, because the phone is remote from the particular reproduction apparatus, the operator is not in direct telephone communication with service
10 personnel while being directed in how to perform some particular time consuming routine maintenance task, such as replenishment of toner and paper as the need arises, or make certain routine adjustments.

15 SUMMARY OF THE INVENTION

In view of the foregoing discussion, this invention is directed to a total customer support network for monitoring a plurality of reproduction apparatus, wherein there is selective interactive
20 communication between the reproduction apparatus customer, the reproduction apparatus per se, and a comprehensive service center. Each of the reproduction apparatus includes an internal computer for monitoring the functions of such reproduction apparatus and
25 storing data relative to the use and operation thereof, and a mechanism for providing telecommunications with the internal computer of the reproduction apparatus. The total customer support network according to this invention comprises a telecommunication network
30 interconnecting the telecommunication providing mechanism of a reproduction apparatus with: a local reproduction apparatus data collecting device; a manned reproduction apparatus customer assistance center; a diagnostic administrative device collecting data from a
35 reproduction apparatus, analyzing collected data, and providing output signals including signals designating alterations necessary for efficient operation of such

reproduction apparatus; a first remote mechanism for
collecting usage data from a reproduction apparatus; a
second remote mechanism, responsive to an appropriate
signal from a reproduction apparatus, for collecting
5 data transmitted from such reproduction apparatus and
providing output signals including signals designating
alterations necessary for efficient operation of such
reproduction apparatus; a device, responsive to a
signal from the diagnostic administrative device or
10 from the second remote mechanism, for dispatching
appropriate field personnel to a selected reproduction
apparatus to provide desired alterations to such
reproduction apparatus for efficient operation thereof;
and a telephone located in close proximity to a
15 reproduction apparatus.

The invention, and its objects and
advantages, will become more apparent in the detailed
description of the preferred embodiment presented
below.

20

BRIEF DESCRIPTION OF THE DRAWINGS

In the detailed description of the preferred
embodiment of the invention presented below, reference
is made to the accompanying drawings, in which:

25 Figure 1 is schematic illustration of a
reproduction apparatus total customer support network,
according to this invention, for association with a
plurality of reproduction apparatus; and

30 Figure 2 is a schematic illustration of one
exemplary reproduction apparatus and its connection to
the total customer support network of Fig. 1.

DETAILED DESCRIPTION OF THE INVENTION

Referring now to the accompanying drawings, a
35 total customer support network, according to this
invention, for monitoring a plurality of reproduction
apparatus is designated generally by the numeral 10.

As best shown in Fig. 2, the reproduction apparatus 12a-12n to be monitored respectively include an internal computer 14 for monitoring the functions of such reproduction apparatus, and storing in a memory device data relative to the use and operation of such apparatus. The computer 14 includes a microprocessor based central processing unit receiving various input and timing signals. The input signal may be, for example, signals representative of the status of various processing stations respectively, while the timing signals may be produced by a sensor detecting actuation of such various processing stations. Based on such signals and programs supplied by software control algorithms associated with the central processing unit, the processing unit provides signals for controlling the operation of the various functions of the reproduction apparatus for carrying out the reproduction process. The production of suitable programs for commercially available central processing units is a conventional skill well understood in the art. The particular details of any such programs would, of course, depend upon the architecture of the designated central processing unit.

As shown and described in aforementioned US Pat. App. Ser. No. 643,592, the reproduction apparatus internal computer is connected through an interface unit 16 so as to provide telecommunications between the internal computer and the total customer support network of this invention. The internal computer 14 is connected to a backup power source such as a battery 18. In this manner, such computer can be accessed through the interface unit 16 even when the associated desired reproduction apparatus is powered down.

The total customer support network 10, according to this invention, comprises various local and remote components for selective interactive communication between the reproduction apparatus customer, the reproduction

apparatus per se, and a comprehensive customer service center. Specifically, the total customer support network 10 includes a local mechanism 20 for collecting data from any of a particular group of reproduction apparatus. As
5 an illustrative example, the local mechanism 20 may be a personal computer connected on a local area network (LAN) with any desired grouping of reproduction apparatus of a particular customer, or group of customers. The personal computer, when equipped with any of a variety of
10 appropriate commercially available communication software packages (e.g., PC Communicator, available from Eastman Kodak Co. of Rochester, New York), can collect data on usage (sorted by apparatus or by user, for example) of any of the reproduction apparatus on the LAN. The customer
15 can then determine, for example, user billing across various reproduction apparatus, or supply usage for any particular reproduction apparatus.

The total customer support network 10 further includes a manned reproduction apparatus customer
20 assistance center 30. The customer assistance center 30 is available to participating customers via an 800 phone number for example. The center is manned by individual operators knowledgeable about a variety of reproduction apparatus. Such operators can talk directly to customers
25 to answer questions about features or functions of a reproduction apparatus, or can take orders for consumable supplies. Further, the operators may make suggestions on how to resolve certain problems with a reproduction apparatus, or inform service personnel that a particular
30 machine problem must be addressed at the customer's site.

Additionally, the total customer support network 10 includes a diagnostic and administrative device 40. The diagnostic and administrative device 40 has the ability to collect data from a particular reproduction
35 apparatus, analyze collected data, and provide output signals including signals, sent back to the particular reproduction apparatus, designating alterations necessary

for efficient operation of such reproduction apparatus. Such device includes, for example, a lap top computer with a modem for receiving and transmitting signals over public phone lines or satellite directly with any preselected reproduction apparatus. Of course, as discussed in the
5 aforementioned US Pat. App. Ser. No. 643,592, the lap top computer of the diagnostic and administrative device can be located locally with respect to a particular reproduction apparatus. As such, the lap top computer can
10 be connected directly to such reproduction apparatus through the serial (RS-232) interface for example.

 The diagnostic and administrative device 40 may be supplemented, or replaced, with an artificial intelligence unit 70. The artificial intelligence unit 70
15 is, for example, a remote computer which has the ability to collect data from a particular reproduction apparatus, analyze collected data, and provide output signals including signals, sent back to the particular reproduction apparatus, designating alterations necessary
20 for efficient operation of such reproduction apparatus. An example of an artificial intelligence unit for reproduction apparatus is shown in US Pat. No. 5,053,815 (issued Oct. 1, 1991, in the name of Wendell). The artificial intelligence unit 70 may also receive signals
25 from the second remote computer 60 to analyze the particular reproduction apparatus.

 Further, the total customer support network 10 includes first and second remote computers 50 and 60. The first remote computer 50 is utilized for collecting usage
30 data from reproduction apparatus. Such data, stored in meters in the reproduction apparatus, is sent to the remote computer 50 over phone lines or satellite when the computer polls the meters of a particular reproduction apparatus. The second remote computer 60 is activated in
35 response to an appropriate signal from a particular reproduction apparatus over phone lines or satellite. When activated, the second computer 60 collects data

transmitted from such reproduction apparatus and provides output signals including signals, sent back to the particular reproduction apparatus, designating alterations necessary for efficient operation of such reproduction apparatus.

Under certain conditions, the diagnostic and administrative device 40, the artificial intelligence unit 70, or the second remote computer 60 may determine that the alterations necessary for efficient operation of a particular reproduction apparatus cannot be remotely effected. In such instances, any of these devices is capable of directly contacting a field administrative system 80 which forms an integral part of the total customer support network 10. The field administrative system 80 (in response to signals from the diagnostic administrative device, artificial intelligence unit, or the second remote computer) can dispatch a field engineer to the customer site to perform service on the particular reproduction apparatus. When the field engineer is dispatched, the system also provides the engineer with the information, tools, and parts necessary to accomplish the repair/alteration of the reproduction apparatus.

Lastly, the total customer support network 10 includes a telephone 90 located in close proximity to a reproduction apparatus. The telephone 90 ties directly into the interface unit 16 of the associated reproduction apparatus. If desired, the telephone may be for example of the direct auto dial type so as to directly call the customer assistance center 30 or a local support center in a district, region, or country where, for example, language barriers preclude a central customer assistance center. Accordingly, if necessary, the customer may be placed directly in voice contact with the customer assistance center or with service personnel.

As will be readily appreciated, as a result of the total customer support network 10, a plurality of reproduction apparatus are directly linked to

administrative, diagnostic, and service systems; and the reproduction apparatus customer is in direct voice communication with assistance and service personnel.

The invention has been described in detail
5 with particular reference to preferred embodiments thereof, but it will be understood that variations and modifications can be effected within the spirit and scope of the invention as set forth in the claims.

What is claimed is:

1. A total customer support system for monitoring reproduction apparatus, said reproduction apparatus including an internal computer for monitoring the functions of such reproduction apparatus and storing data relative to the use and operation thereof, and means for providing telecommunications with said internal computer of said reproduction apparatus, said total customer support system comprising:

local means for collecting data from a reproduction apparatus;

a manned reproduction apparatus customer assistance center;

a diagnostic and administrative device including means for collecting data from a reproduction apparatus, means for analyzing collected data, and means for providing output signals including signals designating alterations necessary for efficient operation of such reproduction apparatus;

first remote means for collecting usage data from a reproduction apparatus;

second remote means, responsive to an appropriate signal from a reproduction apparatus, for collecting data transmitted from such reproduction apparatus and providing output signals including signals designating alterations necessary for efficient operation of such reproduction apparatus;

means, responsive to a signal from said diagnostic administrative device or from said second remote means, for dispatching appropriate field personnel to a selected reproduction apparatus to provide desired alterations to such reproduction apparatus for efficient operation thereof;

a telephone located in close proximity to a reproduction apparatus; and

a telecommunication network interconnecting said telecommunication providing means of a reproduction

apparatus with said local means, said manned reproduction apparatus customer assistance center, said diagnostic administrative device, said first remote means, said second remote means, said dispatching means, and said telephone.

2. The total customer support system according to Claim 1, wherein said telecommunication network includes public phone lines capable of transmitting both voice and data.

3. The total customer support system according to Claim 1, wherein said telecommunication network includes a satellite communication.

4. The total customer support system according to Claim 1, wherein said local means includes a personal computer.

5. The total customer support system according to Claim 1, wherein said first and second remote means include first and second computers respectively.

6. The total customer support system according to Claim 5, wherein said second computer includes means for analyzing collected data, and means for providing output signals including signals designating alterations necessary for efficient operation of such reproduction apparatus.

7. The total customer support system according to Claim 5, wherein said second computer includes an artificial intelligence unit for analyzing collected data, and means for providing output signals including signals designating alterations necessary for efficient operation of such reproduction apparatus.

8. The total customer support system according to Claim 1, further including a battery backup power source for said internal computer of said reproduction apparatus, whereby said internal computer can be accessed even when said reproduction apparatus is powered down.

9. A total customer support system for monitoring reproduction apparatus, said reproduction apparatus including an internal computer for monitoring the functions of such reproduction apparatus and storing data relative to the use and operation thereof, and means for providing telecommunications with said internal computer of said reproduction apparatus, said total customer support system comprising:

- a telecommunication network operatively associated with said telecommunication providing means of a reproduction apparatus;

- local means, connected to said telecommunication network, for collecting data from a reproduction apparatus;

- a diagnostic and administrative device connectable remotely to said telecommunication network or locally directly to said reproduction apparatus, said diagnostic and administrative device including means for collecting data from a reproduction apparatus, means for analyzing collected data, and means for providing output signals including signals designating alterations necessary for efficient operation of such reproduction apparatus;

- a remote manned reproduction apparatus customer assistance center connected to said telecommunication network;

- first remote means, connected to said telecommunication network, for collecting usage data from a reproduction apparatus;

- second remote means, connected to said telecommunication network and responsive to an appropriate

signal from a reproduction apparatus, for collecting data transmitted from such reproduction apparatus and providing output signals including signals designating alterations necessary for efficient operation of such reproduction apparatus;

means, responsive to a signal from said diagnostic administrative device or from said second remote means, for dispatching appropriate field personnel to a selected reproduction apparatus to provide desired alterations to such reproduction apparatus for efficient operation thereof; and

a telephone located in close proximity to a reproduction apparatus, connected to said telecommunication network, for direct voice communication with said manned reproduction apparatus customer assistance center.

10. The total customer support system according to Claim 9, wherein said telecommunication network includes public phone lines capable of transmitting both voice and data.

11. The total customer support system according to Claim 9, wherein said telecommunication network includes a satellite communication.

12. In a total customer support system for monitoring reproduction apparatus, said reproduction apparatus including an internal computer for monitoring the functions of such reproduction apparatus and storing data relative to the use and operation thereof, and means for providing telecommunications with said internal computer of said reproduction apparatus, the method of implementing said total customer support system comprising the steps of:

locally collecting data from a reproduction apparatus;

manning a reproduction apparatus customer assistance center;

collecting data from a reproduction apparatus, analyzing collected data, and providing output signals including signals designating alterations necessary for efficient operation of such reproduction apparatus;

remotely collecting usage data from a reproduction apparatus;

responsive to an appropriate signal from a reproduction apparatus, remotely collecting data transmitted from such reproduction apparatus and providing output signals including signals designating alterations necessary for efficient operation of such reproduction apparatus;

responsive to either of said output signals from, dispatching appropriate field personnel to a selected reproduction apparatus to provide desired alterations to such reproduction apparatus for efficient operation thereof; and

providing a telephone, located in close proximity to a reproduction apparatus for direct voice communication with the manned reproduction apparatus customer assistance center.

Patents Act 1977 Examiner's report to the Comptroller under Section 17 (The Search report)	Application number GB 9506307.9
Relevant Technical Fields (i) UK Cl (Ed.N) H4K KOB, KOC (ii) Int Cl (Ed.6) G03G 15/00, 21/02; G06F 11/22; G07C 3/00; H04M 11/00; H04Q 9/00, 9/02	Search Examiner MR M J BILLING
Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii) ONLINE: WPI	Date of completion of Search 25 MAY 1995
	Documents considered relevant following a search in respect of Claims :- 1 TO 12

Categories of documents

X: Document indicating lack of novelty or of inventive step.	P: Document published on or after the declared priority date but before the filing date of the present application.
Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.	E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.
A: Document indicating technological background and/or state of the art.	&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A,P	EP 0599606 A2 (XEROX) Figures 4, 5. Published 1 June 1994	1, 9, 12
A	WO 92/13295 A1 (EASTMAN KODAK) whole document	1, 9, 12
A	US 5138618 (SHARP) whole document	1, 9, 12

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